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- (54) **PROCEDE DE TRANSFERT SUR SUPPORT LISSE EN PARTICULIER DE REPRODUCTIONS POLYCHROMES ET COUCHE SUPPORT DE TRANSFERT**
(54) **PROCESS FOR TRANSFERRING IN PARTICULAR COLOUR REPRODUCTIONS TO SMOOTH SUBSTRATES AND TRANSFER LAYER**

(57)

A process is disclosed for transferring in particular colour reproductions to smooth substrates by transferring the reproduction by a photocopying process to a transfer layer applied on a carrier. The transfer layer carrying the transferred reproduction (image) is released by a wet process from the carrier, is applied on the substrate, then cured. The transfer layer has a sandwich structure with at least two layers, one (first) outer layer that fixes in place and seals when exposed to heat the pigments transferred by photocopying and a (second) layer arranged beneath the outer layer that forms a curing adhesive layer which cross-links with the substrate, fixing in place the transfer layer on the substrate.



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SUBSTRATES AND TRANSFER LAYER

(57) Abrégé/Abstract:

A process is disclosed for transferring in particular colour reproductions to smooth substrates by transferring the reproduction by a photocopying process to a transfer layer applied on a carrier. The transfer layer carrying the transferred reproduction (image) is released by a wet process from the carrier, is applied on the substrate, then cured. The transfer layer has a sandwich structure with at least two layers, one (first) outer layer that fixes in place and seals when exposed to heat the pigments transferred by photocopying and a (second) layer arranged beneath the outer layer that forms a curing adhesive layer which cross-links with the substrate, fixing in place the transfer layer on the substrate.

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ABSTRACT OF THE DISCLOSURE

A process is disclosed for transferring in particular colour reproductions to smooth substrates by transferring the reproduction by a photocopying process to a transfer layer applied on a carrier. The transfer layer carrying the transferred reproduction (image) is released by a wet process from the carrier, is applied on the substrate, then cured. The transfer layer has a sandwich structure with at least two layers, one (first) outer layer that fixes in place and seals when exposed to heat the pigments transferred by photocopying and a (second) layer arranged beneath the outer layer that forms a curing adhesive layer which cross-links with the substrate, fixing in place the transfer layer on the substrate.

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Description

Process for transferring in particular colour reproductions to smooth substrates and transfer layer.

The invention relates to a process for transferring in particular colour reproductions to smooth substrates by transferring the reproduction by a photocopying process to a transfer layer applied on a carrier. In addition, the invention relates to a transfer layer disposed on a carrier such as wood-free paper for fixing of reproductions transferred using the photocopying process.

Processes for transferring reproductions such as motifs onto plane substrates with porous surfaces such as textiles are known, in which the reproduction is transferred to a paper by dry copying and from there onto the substrates by heat application (WO 91/00385 or Xerox Disclosure Journal Volume 5, Number 3, May/June 1980, p. 229).

To transfer the reproductions, it is necessary on the one hand for the substrate to have a porous surface, and on the other hand for a hot or warm press to be provided in order to effect the transfer to the substrate under considerable pressure.

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Wet processes are also known, for example to apply decalcomania pictures to substrates. In this case, printed images are applied to a carrier material by means of an adhesive in order to release the image from its carrier, then apply it with the adhesive layer to the substrate and then dry it. However, there are no individual reproductions available here that can be designed to choice.

A carrier for decalcomania or slide-off images is known from EP 0 118 084 A1, on which a water-soluble separation layer is applied for one-sided absorption of a releasable printed and/or lacquered layer. EP 0 380 356 A2 describes a decalcomania picture and a process for transferring of, for example, xerographically made images. The carrier used is a paper saturated with solids such that it is not porous. The image to be transferred is applied directly to the carrier or to a plastic film deposited on the carrier. In the former case, the image must then be covered with a plastic film. Transfer to a porous object then takes place, with the plastic film being on the outside at all times.

One of the problems underlying the present invention is to provide a process of the type mentioned at the outset such that any required reproductions can be transferred to a substrate with smooth and substantially non-porous surface, with the reproduction so transferred to be disposed on the substrate in largely scratch-proof form. This should be accompanied by a simplification of the process, so that the layman too can accomplish a transfer of this type.

The problem is substantially solved in accordance with the invention by the image being copied onto or into the transfer layer, in which the pigments transferred using the photocopying process are fixed in place, and by the transfer layer with the transferred reproduction (image) initially being released from the carrier in a wet process,

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then applied to the substrate with the transfer layer to the latter, and then cured. A temperature range preferably between 100°C and 200°C is selected here, preferably in the range from 120°C to 160°, in particular however around 140°C.

By release is understood lateral sliding off the carrier. The transfer layer is then slid onto the substrate.

Accordingly, any reproduction, for example personal pictures, newspaper cuttings, drawings and the like can, in accordance with the invention, be transferred, preferably using xerographic photocopying processes, onto the transfer layer disposed on the carrier, in order to release this transfer layer as a decalcomania picture in a wet process and to apply it, i.e. slide it, onto a smooth and substantially non-porous substrate, such as glass, porcelain, ceramics, metal, enamel or plastic, then dry it (remove the moisture) and cure it.

The reproduction is copied into a layer of the transfer layer preferably having a plexigum material, in order to fix the pigments transferred by the photocopying process and then to enclose, i.e. practically seal, the pigments with heat. This results in a high durability of the image plus a smooth surface.

A separation layer containing dextrin or fatty alcohol is preferably provided between the transfer layer and the carrier, through which separation layer the transfer layer is releasable from the carrier by the addition of moisture.

The invention also relates to a transfer layer, releasably disposed on a carrier such as wood-free paper of max. 120 g per m², for fixing of reproductions transferred in a photocopying process, with this transfer layer being characterised in that it has a sandwich structure

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comprising at least two layers, in that a (first) outer layer fixes in place pigments transferred by the photocopying process and seals them when exposed to heat, and in that a (second) layer disposed underneath the outer layer is an adhesive layer cured by heating and cross-linking with the substrate for fixing the transfer layer in place on this substrate.

The first layer comprises plexigum material on a solvent basis with plasticizer. This first layer has a thickness d of approximately $0.10 \leq d \leq 0.20$ mm, preferably of approximately $d = 0.15$ mm.

The adhesive layer is designed on a synthetic resin basis. The adhesive layer preferably comprises a mixture of synthetic resin with hardener additive and plexigum on a

solvent basis with plasticizers. The synthetic resin and the plexigum proportions can be approximately equal here. The adhesive layer can have a thickness d of $0.02 \leq d \leq 0.08$ mm, preferably of approximately $d = 0.05$ mm. In addition, a separation layer on a dextrin or fatty alcohol basis can be disposed between the transfer layer and the carrier.

As a carrier such as wood-free paper, decalcomania paper known per se can be used, known by the names of "Meta"[®], made by Hoffmann und Engelmann, or "Twincal"[®], made by Britans, with a basic weight of max. 120 g per m².

The separation layer provided between the carrier and the transfer layer contains dextrin and/or fatty alcohol. This permits simple release of the transfer layer from the carrier by means of moisture. By moisture is understood here not only water, but also steam, in order to release the intermediate carrier material in this way.

The process in accordance with the invention is explained in the following on the basis of an example, giving further details, advantages and features of the invention which are also clear from the claims and from the features they describe, singly and/or in combination.

A reproduction to be transferred is placed on a dry copier in order to copy the reproduction onto a transfer layer disposed on a carrier. The carrier used is a decalcomania paper known per se with a basic weight of max. 120 g per m², which is wood-free and commercially available under the names of "Meta" and "Twincal". On this carrier material is

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a separating agent layer containing dextrin and/or fatty alcohol, by which the transfer layer is separable from the carrier using the action of the moisture.

The transfer layer has a sandwich structure with at least one outer fixing layer and one adhesive layer covered thereby.

The fixing layer comprises plexigum on a solvent basis with plasticizer. This layer is relatively soft and therefore suitable for absorbing and fixing the toner. The layer thickness is approximately 0.15 mm.

The adhesive layer comprises an approximately 1:1 mixture of synthetic resin with suitable hardener additive and plexigum on a solvent basis with plasticizer. This layer is designed to be relatively hard and brittle, but has very good cross-linking properties with the new substrate. The layer thickness is approximately 0.05 mm.

The sandwich structure comprising the layers disposed at least one above the other is necessary because:

- a) a single, intermixed layer is still too hard and brittle to be transferred,
- b) no transferable layer thickness would be achievable,
- c) the copying toner would no longer fix cleanly, and
- d) no white or effect layers would be producible.

Once the reproduction has been transferred to the transfer layer, the image is cut out along its outline and placed in lukewarm water. After about 1 minute, the transfer layer comes away from the carrier such that the transfer layer with the image can be slid off the carrier. The free

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transfer layer with the image is then slid directly onto a substrate to be provided with this image and having a smooth and substantially non-porous surface. A squeegee or soft cloth is used to remove moisture such as water still present above and below the layer thus transferred.

In this way, the image is already fixed on its substrate such that it can no longer be moved.

To achieve curing of the transfer layer, i.e. the image, a chemical curing process is applied that starts at a temperature between 140°C and 180°C in the fixing unit of the copying system and would take 4 to 6 days for final curing unless subjected to further heat. This time can however be reduced by supplying heat in the region of 140°C over a period of about 10 minutes after disposing the intermediate carrier material onto the substrate.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A process for transferring a reproduction to a smooth substrate by transferring the reproduction by a photocopying process to a transfer layer applied on a carrier, wherein the reproduction is copied onto or into said transfer layer, in which pigments transferred using said photocopying process are fixed in place, and wherein said transfer layer with said transferred reproduction is initially released from said carrier in a wet process, then applied to said substrate with said transfer layer to the latter, and then cured.
2. A process according to claim 1, wherein the reproduction is a colour reproduction.
3. A process according to claim 1 or 2, wherein release of said transfer layer is achieved by lateral sliding off said carrier.
4. A process according to claim 1, 2 or 3, wherein curing is achieved at a temperature between 100°C and 200°C.
5. A process according to claim 4, wherein curing is achieved at a temperature between 120°C to 160°C.

6. A process according to claim 5, wherein curing is achieved at a temperature of about 140°C.

7. A transfer layer disposed on a carrier for fixing of a reproduction transferred by photocopying, wherein said transfer layer has a sandwich structure comprising at least two layers, wherein an outer layer as a first layer fixes in place pigments transferred by said photocopying process and seals then when exposed to heat, and wherein a second layer disposed underneath said outer layer is an adhesive layer cured by heating and cross-linking with the substrate for fixing said transfer layer in place on said substrate.

8. A transfer layer according to claim 7, wherein the carrier is wood-free paper.

9. A transfer layer according to claim 8, wherein the wood-free paper has a maximum basic weight of 120g per m².

10. A transfer layer according to claim 7, 8 or 9, wherein said first layer comprises plexigum material on a solvent basis with plasticizer.

11. A transfer layer according to any one of claims 7 to 10, wherein said first layer has a thickness d of approximately $0.10 \leq d \leq 0.20$ mm.

12. A transfer layer according to claim 11, wherein d is approximately 0.15 mm.
13. A transfer layer according to any one of claims 7 to 10, wherein said adhesive layer has a thickness d of $0.02 \leq d \leq 0.08$ mm.
14. A transfer layer according to claim 13, wherein d is approximately 0.05 mm.
15. A transfer layer according to any one of claims 7 to 14, wherein said adhesive layer is designed on a synthetic resin basis.
16. A transfer layer according to claim 15, wherein the adhesive layer comprises a mixture of synthetic resin with hardener additive and plexigum on a solvent basis with plasticizers.
17. A transfer layer according to claim 16, wherein the proportions of said synthetic resin and said plexigum are approximately equal.
18. A transfer layer according to at least any one of claims 7 to 17, wherein a separation layer on a dextrin or fatty alcohol basis is disposed between said transfer layer and said carrier.
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